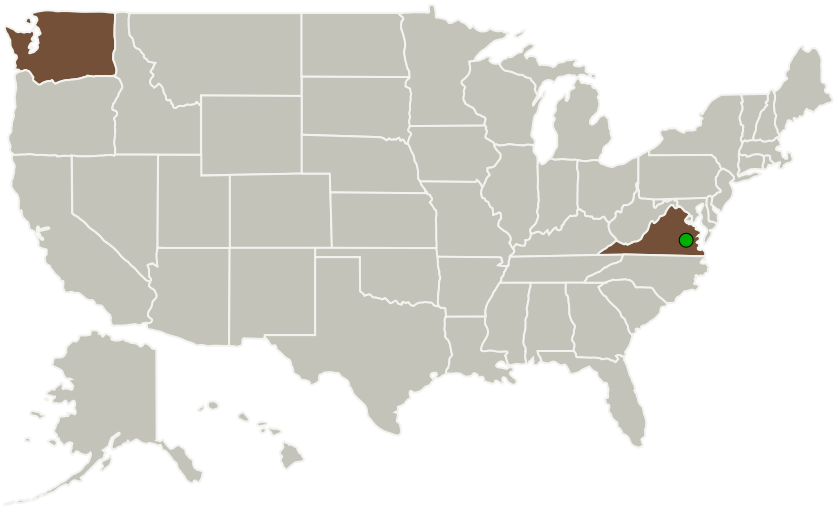
Variable Fidelity Aeroelastic Toolkit - Structural Model, Phase I

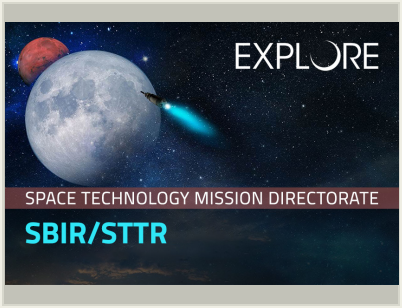
Completed Technology Project (2010 - 2010)

Project Introduction

The proposed innovation is a methodology to incorporate variable fidelity structural models into steady and unsteady aeroelastic and aeroservoelastic analyses in order to utilize the appropriate level of fidelity for the problem at hand. Some aeroelastic problems require detailed finite element modeling of the structure and servoelastic systems, or a detailed FEM may be the only structural model available. Other problems, such as efficient modeling of wind tunnel models and flight vehicles or multidisciplinary optimization (MDO), benefit from the relative simplicity of reduced order structural models. The unique value of this innovation is the ability to rapidly and repeatedly handle the significant difficulty of moving from a detailed model to a reduced order model and then carrying any subsequent design or optimization changes back to the higher order detailed structural model. The proposed methodology will automate the process of projecting lower order model changes, for example after an MDO application, back to the original (source) higher order model. The methodology will contribute to integrated design optimization tools that can synergistically vary the simulation fidelity to find optimum solutions using design variables from more than one discipline.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
TLG Aerospace, LLC	Lead Organization	Industry	Seattle, Washington
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Virginia	Washington

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139519)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

TLG Aerospace, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

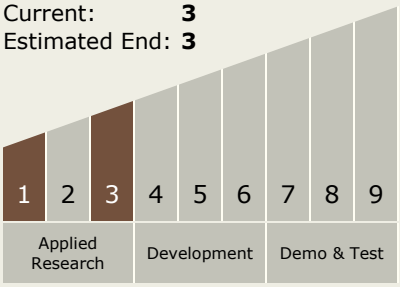
Carlos Torrez

Principal Investigator:

Steve Muenzberg

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.3 Aeroelasticity

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System